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ENTOMOLOGICAL NEWS

VOL. XLVII. JUNE, 1936 No. 6

Psocid Habits.

By H. ELLIOTT MCCLURE, University of Illinois, Urbana, Illinois.

(Continued from page 118.)

VARIATIONS IN EGG LAYING.

The insects are capable of changing their methods of laying, but the sequence may not be broken. A female may walk about while laying a group and, although she may encounter other unfinished groups of eggs, she returns to hers with unerring accuracy. The presence of other insects of her kind in the vicinity does not interfere with the sequence, but should something unusual happen or should she become angered or frightened, the sequence is disturbed and freak groups of eggs result. For example: one female laid six eggs, four in one group and two in another. She completely covered the four with the usual silk, making the mat 1.5 millimeters in diameter. The other two were untouched, no silk having been spun over them. Evidently the two eggs laid apart were not the last two eggs laid for if they had been, she probably would have spun over them. In her wanderings during oviposition she must have lost the original eggs and laid the first, or possibly both, of the two. Then she discovered the others and finished laying and spinning over them. Sometimes the eggs are laid on the rough sooty mold, but preferably they must have a smooth surface. Occasionally a female goes crazy and sprays her eggs about, spinning no web whatsoever over any of them.

A still more unusual variation occurred in the laying of one female. After depositing two eggs she began clearing her alimentary canal by a series of excretions totalling twelve in two hours, during which time she took no food. Later the group was finished normally.

Apparently the stimulus which incites the female to spin over the eggs originates in the ovaries. Very seldom are there more than six eggs mature enough to be laid, so that when these are deposited the ovaries or connecting glands stimulate the silk glands to the enormous production necessary for the spinning. This seems to be true, for the aged adults will lay but one egg, or two, or three, thus exhausting their ovaries and then spin the usual mat over the one, two or three. If, however, an adult lays the full quota of six in two groups, only one receives the silk and the other is not covered. Some adults even when fresh are capable of laying only five at a time and do so consistently throughout their lives. Such bizarre exceptions as the one mentioned above wherein the female spreads her eggs and does not spin are not explicable except on the supposition that the adult was completely worn out.

If the adult is rudely interrupted in her spinning dance, she is incapable of resuming the work where she left off, but leaves the eggs partially covered. The insect is so delicate that to disturb it without fear of injury a drop of water was dropped upon it. In this way females could be interrupted during their spinning exercise without injury to themselves and in no case were they able to return to the spinning and finish it.

The embryonic period is from 5 to 9 days, depending upon the external conditions which apparently greatly affect the development.

Further Biological Notes.

Embryological development, hatching, growth, ecdysis and further biological information on *Ectopsocus* are comprehensively discussed by Miss Wachter (1925), Pearman (1928) and Weber (1931), so that only details and variations will be discussed here.

The oviruptor is borne on the vertex of the head of the embryo. It is colorless, transparent, nearly semicircular in outline and bears 35 to 40 teeth on the outer edge. The most ventral end is slightly knobbed and bears teeth on the side. The structure is about 60 microns long and 12 microns wide at the widest part. On either side is a brace which extends across

the face and down to the eyes. Miss Wachter of California (1925) has followed the hatching of this insect very closely.

The accompanying Table 1 gives the sizes and growth of the nymphs and lengths of the instars. There are from five to six instars depending upon the amount of food available and other conditions. The nymphal life is from 14 to 40 days. Young nymphs are clumsy-footed and gamble among the adults as lambs among the sheep. They trip and bump into their mothers, who do not seem to mind it in the least. The slightest disturbance sends them scurrying pell mell in all directions. The nymphs have the same bulging foreheads as the adults which, with their rather immobile antennae, give them a ram-like appearance.

Table 1. The life cycle of the psocid, *Ectopsocus californicus* Banks, including the duration of the various stages, the sizes and growth of the nymphs and other details.

Stage	Size		Duration
	Length in Millimeters	Width in Millimeters	
Adult	2.4	0.7	15-30 days
Egg-laying period			9-18 days
Laying one egg mass			2 hours
Egg	0.5	0.2	6-9 days
Hatching and shedding of Pronymphal Exuvia			20-40 minutes
1st. instar	0.6	0.2	2-10 days
2nd. Ecdysis			5-10 minutes
2nd. instar	0.8	0.3	2-18 days
3rd. Ecdysis			5-10 minutes
3rd. instar	1.0	0.5	2-7 days
4th. Ecdysis			5-10 minutes
4th. instar	1.2	0.5	2-5 days
5th. Ecdysis			5-10 minutes
5th. instar	1.4 to 1.6	0.6 to 0.65	2-5 days
6th. Ecdysis			5-15 minutes
6th. instar *	1.8	0.7	2-5 days
7th. Ecdysis			12-15 minutes
Adult	2.4	0.7	15-30 days
Nymphs			14-40 days
Life Cycle			30-50 days

* The sixth instar may, in some cases, be the adult, in others an instar immediately preceding the adult. This variation depends upon the individual and the external conditions.

All stages are fastidious, but they can clean their antennae only by stepping on them with a front tarsus and then pulling them out. It is physically impossible for the insects to direct their antennae forward, but they carry them curved to the side or up and back. The feet and legs are cleaned by bending the head under and grasping far up on the femur. Then the leg is drawn through the mandibles as the head is moved forward so that the appendage is thoroughly cleaned with saliva. The adult does not dust the wings.

After each ecdysis there is a reduction in size of the insect, but this is soon regained by feeding. The nymphs are very resistant and can live thirty days without development.

The life cycle of these insects is completed in 30 to 50 days and there are 10 or 12 generations a year in the greenhouse. Under laboratory conditions ten generations were produced in a year, but these conditions were not always favorable to development. Furthermore, during the year the psocids spread in the palm house from a few hundred feeding on the sooty mold on the *Areca* to several thousand feeding on 20 species of plants bearing the mold. Under these conditions the biotic potential of this species about 10^{20}.

No parasites were noted attacking any stage of the psocids.

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Rhectognathus, A New Group in the Lindenius Complex (Hymenoptera: Sphecidae: Crabronini)

By V. S. L. Pate, Cornell University, Ithaca, New York.

There is before me a short series of small Crabronine wasps which represent a new group closely allied to the old world *Encopognathus*. They are particularly interesting in that they exhibit certain features that parallel in some measure those possessed by the more primitive members of the Oxybelini and while probably not ancestral to this group, nevertheless, offer a suggestion as to what that original and probably now extinct stock may have been like.

RHECTOGNATHUS[1] new subgenus.

Head with mandibles simple and acute apically, strongly excised beneath, internally bidentate on basal half; eyes naked; antennal sockets distant, the distance between them almost twice the distance between them and the nearest eye margin; antennae of both sexes 12-segmented, the pedicel and the first and second flagellar segments subequal in length, scapes compressed and evenly, arcuately, inwardly bowed—strongly so in the male, weakly in female; ocelli arranged in a very flat triangle; maxillary palpi 6-segmented, labial 4-segmented. Females with a well developed psammophore.

Thorax subtly punctured; mesopleura rounded anteriorly, not sharply margined (i.e. without an epicnemium), smooth, shining, and finely punctate; mesepisterna without a precoxal carina before the middle coxae; suture between the mesonotum and the scutellum simple, not dilated laterally; middle tibiae with one small calcaria apically.

Wings with the marginal cell of the fore wing rather long, squarely truncate apically, the transverse cubital vein distinctly angulate, perpendicular above, sharply inclined basad below to cubitus, joining the radius about middle of marginal cell, recurrent vein joining cubitus about middle and not causing it to be appreciably angled backward; first discoidal cell trapezoidal. Anal lobe of hind wings not longer than the submedian cell.

Abdomen depressed; first and second segments broadly sessile; first and second tergites with a sharp edge laterally as in *Belomicrus* and somewhat inflexed, remaining tergites inflexed

[1] ρηκτος, broken + γναθος, jaw, in allusion to the structure of the mandibles.

but without sharp margins laterally; pygidial area present in both sexes; first three sternites flatly convex, remainder flatly concave.

Genotype: *Encopognathus* (*Rhectognathus*) *pectinatus* new species.

Encopognathus (Rhectognathus) pectinatus new species.

♂. Length 5 mm. Black with a nigrocaeruleous tinge particularly on face; the following light yellow: scapes, pedicel and flagellum anteriorly and beneath, save the last segment of the last which is abruptly entirely black; pronotal tubercles; postscutellum; fore femora with a stripe beneath, middle femora with a stripe anteriorly, all tibiae and tarsi. Abdomen with the first two segments black basally, apical half orange-rufous, remainder of abdomen orange-rufous. Clypeus and lower part of the front with appressed silvery pubescence; upper portion of face and vertex with very short, erect, rather sparse pile. Thorax with short sparse, suberect pubescence. Abdomen with sparse decumbent aeneous pubescence longer than that of thorax. Wings hyaline with a fuscous tinge; veins brown.

Head shining, finely, subtly punctured; clypeus medio-apically truncate and with a very flat, transverse, triangular, shining, impunctate bevel; scapes strongly compressed, strongly and evenly bowed inwardly, anteriorly with a longitudinal keel; pedicel and flagellum strongly compressed, the pedicel and the first flagellar segment strongly pectinate apically, the pedicel and the first and second flagellar articles subequal in length, the last flagellar segment strongly flattened and subspatulate; a short median longitudinal impressed line from the anterior ocellus; ocellar line about one and one-half times the length of the ocellocular line.

Thorax shining, with fine subtle puncturation; pronotum rounded anteriorly, not carinate, dorsally with a narrow, transverse shallow groove, semicircularly excised medially; mesonotum with puncturation similar to front but closer; mesopleura shining, anteriorly with sparse, fine puncturation, posteriorly along with the metapleura highly polished and impunctate; scutellum finely striato-punctate; postscutellum strongly convex, anterior margin strongly concave. Propodeum finely, irregularly, clathrately rugulose throughout, with the dorsal triangular area poorly defined, posterior face with a distinct pyriform median fovea which is smooth and shining within. Anterior tarsi with the first segment as long or longer than the remaining segments and somewhat flattened and distorted; middle tarsi with the first segment strongly bowed, subequal in length to the remaining

segments; hind tarsi with the first segment thickened and subequal in length to the remaining segments; middle and hind tibiae thickened apically and minutely spinose externally.

Abdomen depressed, cordiform, shining, with very fine, well separated, regularly disposed punctures; pygidium flat, subtrigonal, the apex broadly rounded, beset with coarse, scattered punctures; second and third sternites flatly convex, remainder shallowly concave, the lateral margins of the tergites folded under to the ventral surface and imbricate with the lateral margins of the sternites.

♀. Length 6.5 mm. Black; the following light yellow: scapes, pedicel and flagellum beneath; pronotum dorsally on each side of the median excision with a short, narrow, transverse line, the tubercles; tegulae anteriorly and the axillary sclerites; posterior margin of the scutellum with a narrow line interrupted medially; postscutellum; fourth abdominal tergite with a narrow, indistinct, preapical fascia; fifth tergite with a broader, distinct preapical fascia; last tergite entirely, inflexed ventral portions of the fourth and fifth tergites; all tibiae and tarsi; fore femora save posterior basal half, middle and hind femora apically. The following fulvofuscous: mandibles medially; clypeus discally; pedicel and flagellum above; apical margins of the first three abdominal tergites. Clypeus except the triangular bevelate area, and the lower part of the front with appressed silvery pubescence; upper half of face and vertex with short, dark, erect, pubescence; abdomen with decumbent, rather sparse, aeneous pile.

Head with the face, save for the nitidous antennal scrobes, subopaque, and finely, semiconfluently acupunctate, temples aciculate; the scape not as strongly bowed as in the male, the anterior longitudinal keel very weak, pedicel but not the flagellum compressed as in the male, the pedicel and the first flagellar article simple, not pectinate: clypeus discally to apex with an equilateral triangular, shining, highly polished, impunctate bevelate area, medioapically truncate and 7-dentate; mandibular and temporal ammochætæ well developed.

Thorax similar to that of the male, the puncturation of the mesonotum, however, closer, and the scutellum aciculate; humeral, trochanteral, femoral and tibial ammochætæ well developed, the tibiae with a series on the fore as well as on the hind margin; a short tarsal comb present on fore tarsi which are flattened. Propodeum with the dorsal, posterior and caudal portion of the lateral faces shining and transversely, finely striate, the triangular dorsal enclosure and the median fovea of

the posterior face obsolescent. Legs similar to male but the spination of the middle and hind tibiae stronger.

Abdomen similar to male; pygidium triangular, the apex acute, beset with coarse scattered punctures.

Holotype.— ♂, Claremont, CALIFORNIA (C. F. Baker) [Cornell University Type No. 1405]. *Allotype.*— ♀, (same data as type). *Paratypes.*—3 ♂♂, Bryson, CALIFORNIA, April 25, 1917 (E. P. Van Duzee).

The closest allies of *Rhectognathus* are to be found in the old world Mediterranean and Æthiopian *Encopognathus* group with which it agrees in the characteristic venation of the fore wing and the naked eyes, but differs in possessing subtle puncturation and sculpture and in lacking an epicnemium and a precoxal carina on the mesepisterna before the middle coxae. Specimens of *Encopognathus* are very rare in collections and while a number of species have been described, these are known mainly only from the females. Kohl, however, in his monograph of the Palæarctic Crabrones, notes the fact that he has before him a male [2] of an undescribed Indian species but does not state how many segments it has in the antennae, and I have consequently assumed that the males of *Encopognathus* possess the normal number of thirteen. In the Nearctic species before me, *Rhectognathus pectinatus*, the males have only twelve segments in the antennae, which will further serve to differentiate the *Rhectognathus* group from *Encopognathus*.

Kohl and various other authors consider *Entomognathus* and *Encopognathus* as merely subgenera of *Lindenius*. However, I believe that those groups in which the mandibles are excised beneath should be accorded a rank co-ordinate with that of *Lindenius*. Moreover, at present, I consider that the group with hairy eyes—*Entomognathus*—should be ranked as a genus distinct from those with naked eyes—*Encopognathus* and *Entomocrabro*. An unique female from the Putomayo or Rio Pachitea district of Peru before me agrees very well with Kohl's descriptions and figures of *Entomocrabro*,[3] save that the first discoidal cell has a tendency to be trapezoidal rather than

[2] Ann. k. k. naturhist. Hofmus. Wien, 1915, xxix: 320.

rhomboidal. Until I have had an opportunity, consequently, to see more material of this group, particularly of the males, I regard it tentatively as a distinct genus closely allied to *Rhectognathus* and somewhat annectant between it and *Entomognathus*. I have seen no material of *Encopognathus* and know it only from the descriptions and figures of Kohl [4] and Arnold,[5] but as indicated above, it is indubitably very closely allied to *Rhectognathus* which may best be considered as only a subgenus of it.

At first glance, *Karossia* described by Arnold[6] for a unique female from South Africa might be thought to belong to this group. However, Arnold states that the middle tibiae have two calcaria apically and I therefore think that because of this and certain other features it exhibits that it should be accorded tribal rank. The Karossiini apparently are rather generalized forms and no doubt represent a surviving remnant of that primitive stock from which have arisen two divergent lines, the Crabronines proper and the Oxybelines.

Nothing is known of the ethology of either *Encopognathus* or *Rhectognathus,* but from the well developed psammophore of the female in the latter, this group probably build their nests in sandy soil or dry ground, excavating their burrows in a manner similar to that of *Belomicrus* and *Anacrabro*.

Until further material is forthcoming, the following key will serve to distinguish the various groups of this complex.

A. Middle tibiae with two apical spurs; mandibles excised beneath; South African forms,
KAROSSIINI: *Karossia* Arnold.

—Middle tibiae with one or no apical spurs....CRABRONINI: 1.

1. Abdominal tergites abruptly flexed under at the sides so that the ventral and dorsal portions of the tergites form a sharp edge at their junction; sternites flat or concave; New World forms.....*Anacrabro* Packard.

—Abdominal tergites not abruptly flexed under at the sides, at most with only the first two with a sharp edge laterally;

[4] Verh. Zool. Bot. Ges. Wien, 1905, lv: 356.
[4] Ann. k. k. naturhist. Hofmus, Wien, 1896, xi: 486.
[5] Ann. Transvaal Mus. 1926, xi: 345.
[6] Ann. Transvaal Mus. 1929, xiii: 409.

sternites more or less convex.....2.

2. Mandibles simple and acute apically; ocelli arranged in a flat triangle; a distinct pygidial area present in both sexes.3.

—Mandibles bidentate, tridentate, or blunt and obliquely truncate apically; ocelli usually not arranged in quite so flat a triangle; a distinct pygidial area usually not present in the males .....*Crabrones ceteri.*

3. Mandibles entire beneath; eyes naked; mesepisterna without a precoxal carina before the middle coxae,
Lindenius Le Peletier.

—Mandibles excised beneath .....4.

4. Eyes hairy; mesepisterna without a precoxal carina before the middle coxae; marginal cell of the fore wing elongate, the transverse cubital vein straight and inclined, the recurrent vein joining the cubitus distinctly beyond the middle and not causing it to be angled appreciably backward; anal lobe of the hind wing longer than the short submedian cell; abdominal tergites 2-5 (and 6 in the males) basally with a transverse furrow which curves caudad laterally and runs parallel to the lateral margins, basal portion covered by the preceding tergite, the lateral portions visible.....*Entomognathus* Dahlbom.

—Eyes naked; anal lobe of the hind wing shorter than the submedian cell; abdominal tergites not so constructed....5.

5. Marginal cell of fore wing short, the transverse cubital vein straight and inclined, joining the radial vein distinctly before the middle of the marginal cell; recurrent vein joining the cubitus distinctly before the middle and causing it to be appreciably angled backward; first discoidal cell rhomboidal; mesepisterna without a precoxal carina before the middle coxae and with a horizontal longitudinal foveolate furrow from the foveolate episternal suture to meso-metapleural suture just above the middle coxae; eyes at the level of the antennal sockets close together, sculpture and puncturation fine; Neotropical forms .....*Entomocrabro* Kohl.

—Marginal cell of fore wing longer, the transverse cubital vein distinctly angulate, the upper portion perpendicular, the lower part sharply inclined to cubitus, joining the radius about the middle of marginal cell; recurrent vein joining cubitus about at middle and not causing it to be appreciably angled backward; first discoidal cell trapezoidal;

eyes not so close together at the level of the antennal sockets .....*Encopognathus* Kohl.

Subgenera of *Encopognathus*.

Head and thorax coarsely sculptured; mesepisterna sharply margined anteriorly (i.e. with an epicnemium), and with a precoxal carina before the middle coxae; males with 13-segmented antennae; Old World forms, *Encopognathus* Kohl.

Head and thorax subtly punctured at most; mesepisterna rounded anteriorly, without a sharp margin, and without a precoxal carina before the middle coxae; males with 12-segmented antennae; females with a psammophore; New World forms.....*Rhectognathus* new subgenus.

New Organization for Amateur Entomologists.

In the March issue of *Hobbies* magazine appeared an extensive article on butterflies, by Frank Clay Cross, together with an advertisement announcing the formation of a new organization for amateur entomologists. The aims of the new group, which is known as the Entomologists' Exchange Association, are as follows:

1. To foster a more scientific attitude toward the study of butterflies, moths, beetles and other insects by amateur collectors throughout boreal America, and to encourage more persons to become purposeful collectors, to the end that our knowledge of the various species may be extended by more widespread and intensive research.

2. To assist amateur collectors with appropriate information, and in the identification of specimens.

3. To facilitate the exchange of entomological specimens among collectors, both amateur and professional, in various parts of North America.

While the Entomologists' Exchange Association is primarily to help amateur collectors, professional entomologists are also invited to participate in its activities, and to cooperate with its organizers in accomplishing the aims which have been set for it. It is a purely non-profit organization. Inquiries and offers of assistance should be addressed to Frank C. Cross, 1362 Race Street, Denver, Colorado.

Some Notes and Records of Minnesota Orthoptera.

By Wm. C. Stehr, Ohio University, Athens, Ohio.

During the late summer of both 1934 and 1935 the writer made some observations and collections of Orthoptera in western and northern Minnesota which are perhaps worth recording. In 1934 five weeks were spent in Odessa and Artichoke Townships, in Big Stone County, where the extreme drought had practically ruined all crops. The chief vegetation in the fields and pastures in August and September was Russian thistle, *Salsola kali* var. *tenuifolia* G. F. W. Mey. Prairie grasses were present only in areas that had not been cultivated for years or had never been brought into cultivation. Other weeds and grasses were evident only near runs and depressions where slightly more moisture was available. Small grains had been cut or pastured and corn was a complete failure. In most places half or less of the soil surface was covered by vegetation. Orthoptera, principally Acrididae, were abundant. After each trip into the field notes were made as to the species encountered and their relative abundance. Examination of these notes shows that the following were the commonest species. They are listed in order of their abundance: *Melanoplus gladstoni* (Scudder), *Agenceotettix deorum deorum* (Scudder), *Melanoplus mexicanus mexicanus* Saussure, *Trachyrachis kiowa kiowa* (Thomas), *Camnula pellucida* (Scudder). Eighteen other species of Orthoptera were present but none of them were so generally widespread over the areas examined.

In 1935 five weeks were again spent in this area at approximately the same time of year. Much more rain had fallen during the preceding months although a six-week drought in the latter part of July and the first three weeks of August had injured crops and other vegetation severely in the region. However Russian thistle had been replaced to a large degree by ragweeds and other plants which normally take possession of more or less barren areas of roadsides and pastures and of stubble fields. The Orthoptera were not as abundant as in the preced-

[1] Paper No. 10, from the Department of Bioligy, Ohio University, Athens, Ohio.

ing year, but more species were encountered. They were evidently somewhat later in reaching maturity, since many more nymphs were noted in the fields. *Melanoplus gladstoni* (Scudder) was still the most abundant species present, but the order of abundance of other species had changed considerably. *Melanoplus mexicanus mexicanus* Saussure and *Melanoplus femur-rubrum femur-rubrum* (DeGeer) were both widespread and very abundant. *Arphia pseudonietana pseudonietana* (Thomas), *Ageneotettix deorum deorum* (Scudder), *Orphulella speciosa* Scudder, and *Spharagemon collare* (Scudder) followed in abundance in the order named. *Trachyrachis kiowa kiowa* (Thomas) was much less numerous and of *Camnula pellucida* (Scudder) only five individuals were seen in the area in 1935. Two species of Tettigoniidae, *Conocephalus fasciatus fasciatus* (DeGeer) and *Conocephalus saltans* (Scudder) were found in small numbers. *Gryllus assimilis* Fabr. and several species of *Oecanthus* were more numerous than in 1934. Altogether 32 species were collected in 1935, including all but one of those found in 1934. The records of the two seasons show that the less xeric species had fared much better in 1935 than in 1934 and that the opposite is true of at least some of the truly xeric species. The changes in the Orthopteran fauna of these townships from 1934 to 1935 emphasize the importance of changing weather conditions upon populations of these insects.

In 1935 a few collections were also made in northern Minnesota. Altogether 49 of the 129 species and races recorded by Hebard ('32) for Minnesota were taken in the areas visited. It is not worth while to publish all of the records in detail, but the following may be of interest for one or more of the reasons here given: new records for the state, rarity in Minnesota, paucity of published records, extension of range in the state, or filling of gaps in published records of the range.

PHASMIDAE.

Diapheromera velii velii Walsh. Odessa township, Big Stone County, 1 ♂ 8-28-28.

ACRIDIDAE.

ACRYDIUM ARENOSUM ANGUSTUM (Hancock). Big Falls 3 ♂, 3 ♀ 8-30-'35, and Little Fork, 3 ♂, 3 ♀ 8-30-'35 in Koo-

chiching County. With the exception of Somes' ('14) record from Warroad, these records are far north of others published for the state.

PSEUDOPOMALA BRACHYPTERA (Scudder). Artichoke Township, Big Stone County, 3 ♂ 9-7-'35, 5 ♂, 5 ♀ 9-12-'35. These are the first records for this region since 1900.

OPEIA OBSCURA (Thomas). Odessa and Artichoke Twnps., Big Stone Co., 19 ♂, 20 ♀ 8-17 to 9-13, '34 and '35. This Great Plains species is not abundant but is met with frequently in places where the finer native prairie grasses remain.

NEOPODISMOPSIS ABDOMINALIS (Thomas). Bemidji 7 ♂, 4 ♀ 8-29-'35; Park Rapids 4 ♂, 3 ♀ 8-28-'35; Laurel, Koochiching Co. 1 ♀ 8-30-35. One male and some nymphs reported from Bemidji by Somes and a juv. male recorded from Greenbush by Hebard are the only other records from Minnesota. The Park Rapids record extends the range southward about 50 miles and the Laurel record extends it eastward in the state about 100 miles.

AGENEOTETTIX DEORUM DEORUM (Scudder). Park Rapids 2 ♂ 8-28-'35. This extends the range eastward in this latitude.

ENCOPTOLOPHUS SORDIDUS COSTALIS (Scudder). Odessa Twnp. Big Stone Co. 1 ♀ 8-17-'35, 1 ♀ 9-13-'35; Artichoke Twnp. Big Stone Co. 2 ♂ 9-5-'35; 1 ♀ 8-19-'35. Only six specimens of this species have been recorded from the state previously, half of them from Beardsley and Brown's Valley, both in Big Stone Co. These specimens are perfectly distinct from *E. sordidus sordidus* (Burm.) which is quite common in this area. The smoother appearance, more distinct and more solid maculation of the tegmina, and very bluish tibiae make them readily recognizable when placed beside a series of that race.

PARDALOPHORA HALDEMANNII (Scudder). Anoka County (sand), 1 ♂ 5-28-'28: Odessa Twnp. Big Stone Co. 1 ♀ 8-16-'34. The latter specimen was an exhausted female barely able to crawl and very badly worn when captured, evidently a rather late survivor.

SPHARAGEMON COLLARE (Scudder). Big Falls, Koochiching Co. 1 ♂ 8-30-'35; Park Rapids 4 ♂, 4 ♀ 8-28-'35. Cass Lake is the only other record from the north central woods area.

MELANOPLUS MANCUS ISLANDICUS Blatchley. Little Fork 3 ♂, 7 ♀ 8-30-'35, and Big Falls 1 ♀ 8-30-'35, in Koochiching County. These records extend the range westward in northern Minnesota.

M. DIFFERENTIALIS (Thomas). This species was common among the rank vegetation of glacial depressions in Big Stone

Co. in 1935. A melanistic form sometimes occurs with the typical form. The following are records of females entirely black except for two yellowish bars on each femur. Odessa Twnp. 1 ♀ 9-4-'35; Artichoke Twnp. 1 ♀ 9-12-'35.

M. DAWSONI (Scudder). The brachypterous form is common in western Minnesota but macropterous individuals are rare. Odessa Twnp. Big Stone Co. 1 mac. ♂ 8-19-'35, 1 mac. ♀ 9-13-'35.

M. INFANTILIS Scudder. This species is rare in Minnesota. Odessa Twnp., 1 ♀ 8-19-'35, and Artichoke Twnp., 1 ♀ 9-5-'35, in Big Stone County.

M. BRUNERI Scudder. Park Rapids 3 ♂, 4 ♀ 8-28-'35; Bemidji 2 ♂ 8-29-'35; Big Falls 1 ♂ 8-30-'35, and Laurel 1 ♂ 8-30-'35 in Koochiching County; Midland, Crow Wing Co. 1 ♀ 8-31-'35. These records show that Hebard's prediction that this species should be found over nearly all of the northern coniferous area of Minnesota is correct.

M. KEELERI LURIDUS (Dodge). Park Rapids 9 ♂, 12 ♀ 8-28-'35; Bemidji 3 ♂, 7 ♀ 8-29-'35; Big Falls 1 ♀ 8-30-'35; Little Fork 1 ♀ 8-30-'35, and Laurel 1 ♂, 3 ♀ 8-30-'35, Koochiching County. These records extend the range of this species practically to the Canadian border in north central Minnesota.

M. PACKARDII Scudder. This species occurs only in extreme western Minnesota and is rather rare there. Odessa Twnp., 1 ♂, 2 ♀ 8-23-'34, 1 ♂, 1 ♀ 8-17-'35, 1 ♂, 2 ♀ 8-26-'35, and Artichoke Twnp. 1 ♀ 8-27-'34, Big Stone County.

PHOETALIOTES NEBRASCENSIS (Thomas). Odessa Twnp. Big Stone Co. 3 macropterous ♂ 9-13-'35. Macropterous individuals are rare in Minnesota although the brachypterous form is rather common.

GRYLLIDAE.

NEMOBIUS CAROLINUS BREVICAUDUS Bruner. Odessa Twnp., 1 ♀ 8-18-'34, 2 ♂, 3 ♀ 8-21-'34, 1 ♀ 8-23-'34, 1 juv. ♂, 2 juv. ♀, 4 ♀ 8-26-'35, 4 ♀ 8-27-'35, and Artichoke Twnp. 2 ♂, 2 ♀ 9-4-'35; 2 ♂, 1 juv. ♀, 4 ♀ 9-5-'35, Big Stone County. These are the first records of this western cricket from Minnesota. The author is indebted to Mr. E. S. Thomas of Columbus, Ohio, and to Dr. B. B. Fulton of North Carolina State College for assistance in the identification of this species. One of the Odessa Twnp. specimens (♀) is macropterous.

OECANTHUS NIGRICORNIS NIGRICORNIS F. Walker. Artichoke Twnp. Big Stone Co. 1 ♀ 9-5-'35. This is a westward extension of the range of the species in Minnesota.

OE. NIGRICORNIS ARGENTINUS Saussure. This species was

recently reported from Minnesota for the first time by Hebard ('32). Odessa and Artichoke Twnps. Big Stone Co. 9 ♂, 15 ♀ 8-20 to 9-5, '34 and '35.

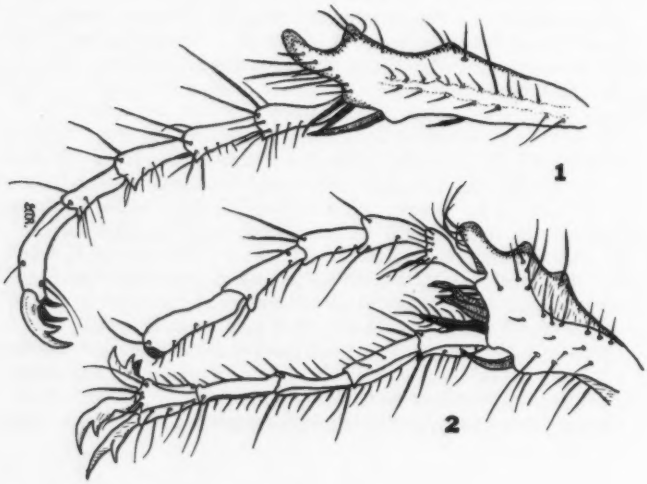
OE. NIGRICORNIS QUADRIPUNCTATUS Beutenmüller. Big Falls, Koochiching Co., 1 ♂ 8-30-'35. This record is far north of the previously published records for the state.

An Insect with Seven Tarsi (Coleop.: Scarabaeidae).

Monstrosities among insects are one of the rewards of the student who examines large numbers of specimens. The accompanying figures illustrate a peculiar condition of this kind, figure 1 showing the normal tarsus of this species and figure 2 the monstrosity.

A male specimen of *Phyllophaga futilis* Lec. with an abnormally developed right front leg was taken with others of the same genus near lights in State Park 47, Western Springs, Illinois, during the last week of June, 1935.

The tibia of the deformed leg is shorter than normal, and twisted. It has three tibial spurs instead of one. Two tarsi of the normal number of five segments are borne on this right front leg (Fig. 2). One tarsus has three tarsal claws instead of two, the third one bearing an extra point. There are no claws on the other tarsus.—GARLAND T. RIEGEL, Champaign, Illinois.



New List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
15. Annales Academia Brasileira de Sciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bolletino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco. Cal.
56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.

59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslavokia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society. Lawrence, Kansas
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Cientifica Argentina, Bueros Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten uber morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biologia Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology. University of Michigan.
115. Memorias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then **the** pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

(*) Papers containing new forms or names not so stated in titles, **have** an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Benjamin, F. H.—Obituary by Muesebeck & Heinrich. [10] 38: 25-26, ill. Obituary by G. P. Englehardt. [19] 31: 48. **Caudell, A.**—In Memoriam by Howard & Busck. [10] 38: 33-47, ill. **Englehardt, G. P.**—The desert in bloom. [19] 31: 49-56. **Frost, S. W.**—Ancient Artizans. The Wonders of the Insect World. Van Press, Boston, 1936. 295 pp., ill. **Harkema, R.**—The parasites of some N. Carolina rodents. [Ecol. Mon.] 6: 153-218. **Neave, S. A.**—The Relations between mankind and the insect world. [107 A] 10: 112-121. **Samson, E.**—Etalage des papillons avec des presses en verre. [Bul. Soc. Linn. Lyon] 4: 61-64, ill. **de la Torre Bueno, J. R.**—Nationalistic science. [19] 31: 78.

ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—On the olfactory powers of a necrophilous beetle (Staphy.). [19] 31: 73-75. **Abercrombie, W. F.**—Studies on cell number and the progression factor in the growth of Japanese beetle larvae (Popillia japonica). [Journ. Morph.] 59: 91-112, ill. **Ahrens, W.**—Monographie des weiblichen geschlechtsapparates der termiten. [Jenais. Zeit. Naturw.] 70: 223-306, ill. **Alpatov, W. W.**—Contribution to the study of the variation in the honeybee. IV. The Egyptian honeybee and its position among other bees. [Bull. Soc. Nat. Moscow] (Biol.). 44: 290-292. **Becker & Roudabush.**—Brief directions in histological technique. Collegiate Press,

Ames, Iowa, 1935. 80 pp. **Boese, G.**—Der einfluss tierischer parasiten auf den organismus der insekten. [Zeit. Parasitenk.] 8: 243-284, ill. **Bytinski-Salz, H.**—Die Ausbildung des Chitinpanzers in der Schmetterlingspuppe. [97] 56: 35-61, ill. **Carlson, J. G.**—The intergeneric homology of an atypical euchromosome in several closely related Acridinae (Orthop.). [Journ. Morph.] 59: 123-161, ill. **David, K.**—Beitrage zur Anatomie und Lebensgeschichte von Osmylus chrysops. (Neurop.). [46] 134: 151-206, ill. **Debaisieux, P.**—Organes pulsatiles des tibias de Notonectes. [Ann. Soc. Sci. Bruxelles] (B), 56: 77-87, ill. **Delbrück & Timofeeff-Ressovsky.**—Cosmic rays and the origin of species. [31] 137: 358-359. **Diakonoff, A.**—Contribution to the knowledge of the fly reflexes and the static sense in Periplaneta americana. [Arch. Neerl. Phys Homme et Anim.] 21: 104-129. **von Frankenberg, G.**—Das Puppenstadium der Florfliege (Chrysopa vulgaris). [97] 56: 94-100, ill. **Friesen, H.**—Roentgenmorphosen bei Drosophila. [87] 134: 147-165. **Gorski, W.**—Beitrag zur Kenntnis der Morphologie von Acentropus niveus (Lepidop.). [Trav. Soc. Sci. Lit., Wilno] IX, no. 33: 19 pp., ill. (Polish, Germ. summ.) **Griswold & Crowell.**—The effect of humidity on the development of the webbing clothes moth (Tineola biselliella). [84] 17: 241-250, ill. **Guareschi, C.**—Ricerche sperimentali sulla nymfosi degli insetti. [Arch. Zool. Torino] 22: 197-221, ill. **Heidt, K.**—Ueber das Leuchten der Collembolen Onychiurus armatus und Achorutes muscorum. [97] 56: 100-109. **Heil, K. H.**—Beitrage zur Physiologie und Psychologie der Springspinnen (Salticidae). [Zeitschr. Vergleich. Phys.] 23: 1-25, ill. **Karsakoff, M.**—Le role du coloris des ailes du "iris deserti" dans le rapprochement des sexes. [Bul. Soc. Linn. Lyon] 4: 144. **Ludwig & Abercrombie.**—Histological changes accompanying the growth of the mid-intestine of Japanese beetle larvae (Popillia japonica). [Journ. Morph.] 59: 113-122. **Oosthuizen, M. J.**—The effect of high temperature on the confused flour beetle. [Univ. Minn. Ag. Exp. Sta.] Tech. Bul. 107: 44 pp. **Pagast, F.**—Ueber Bau und Funktion der Analpapillen bei Aedes aegypti. (Dipt: Culic.). [89, Abt. Zool. & Phys.] 56: 183-218, ill. **Poll, M.**—Le tube de malpighi des insectes comparé au tube urinane des vertebres. [An. Soc. R. Zool. Belg.] 65: 87-95. **del Portillo, J.**—Beziehungen zwischen den Offnungswinkeln der Ommatidien, Krümmung und Gestalt der Insektenaugen und Ihrer Funktionellen Aufgabe. [Zeit-

schr. Vergleich, Phys.] 23: 100-145, ill. **Querci, O.**—Effects of the temperature on the development of Pieris brassicae. [21] 48: 37-41. **Thiel, H.**—Vergleichende untersuchungen an den vormägen von käfern. [94] 147: 395-432, ill. **Tonner, F.**—Mechanik und Koordination der atem-und Schwimmbewegung bei Libellenlarven. [94] 147: 433-454, ill. **Wagner, J.**—Aphanipterologische Notizen. Ueber das Reduzieren des 8. Abdominalsternits bei den Männchen einer Ceratophyllinengruppe. [56] 15: 85-96, ill. **Wheeler, W. M.** — Binary anterior ocelli in ants. [92] 70: 185-192, ill. **Zwingiebl, L.** — Ueber missbildungen bei blattwespen. [Veroef. Deut. Mus. Bremen] 1: 199-201, ill.

ARACHNIDA AND MYRIOPODA.—Allard, H. A.—The Drumming Spider (Lycosa gulosa). [95] 49: 67-68. **Baerg, W. J.**—The Black Widow. [Univ. Arkansas, Coll. Agr. Exp. Sta.] Bull. 325: 34 pp., ill. **Bishop & Crosby.**—A n. g. of spiders in the Erigoneae. [95] 49: 39-42, ill. **Chamberlin, R. V.**—Records of North American Gnaphosidae with descriptions of n. sps. [40] No. 841: 30 pp., ill. **Ewing, H. E.**—A short synopsis of the North American species of the mite genus Dermanyssus. [10] 38: 47-54, ill. (*). **da Fonseca, F.**—Ocorrencia de uma nova sub esp. de Ixodes ricinus no Estado de S. Paulo] 2: 31-34. **Marshall, R.**—Hydracarina from Yucatan. [Carnegie Inst. Wash.] Pub. 457: 133-137, ill. (*). **Pearse, A. S.**—Parasites from Yucatan. [Carnegie Inst. Wash.] Pub. 457: 45-59. **Roewer, C. F.**—Chelonethi oder pseudoskorpione. Chelonethi, Podogona, Opiliones. [Bronn, Klassen des Tierreichs] 5 (4): 1-160, ill. **Roewer-Bremen, C. F.**—Zwei myrmecophile spinnen arten Brasiliens [Veroef. Deut. Mus. Bremen] 1: 193-197, ill. (*). **Werner, F.**—Scorpiones, Pedipalpi. [Bronn, Klassen des Tierreichs] 5 (4), 317-490, ill.

THE SMALLER ORDERS OF INSECTS—Artigas, P.—Sobre a presenca de Ctenocephalides canis em Curitiba (Siphonaptera). [Bol. Biol. S. Paulo] 2: 34-38, ill. **Emerson, A. E.**—Distribution of termites. [68] 83: 410-411. **Hood, J. D.**—Frankliniella gossypiana, new name (Thysanoptera). [95] 49: 68. **Kutchka, G. M.**—The probable distribution of termites through greenhouse plants. [19] 31: 45-48. **Moulton, D.**—Two n. sp. of Thysanoptera in Argentina and records of other species. [106] 120: 254-257. **Moulton, D.**—New American Thysanoptera. [19] 31: 61-65. **Pessoa e Guimaraes.**—Contribucoes para o conhecimento

das Mallophages das aves do Brasil nova sp. do gen. Rallicola e Esthiopterum. [An. Fac. Med. Univ. So. Paulo] 11: 169-171, 311-314, ill. **Tillyard, R. J.**—Are termites descended from true cockroaches? [31] 137: 655, ill. **Wagner, J.**—Einige neue oder bekannte Floharten. [Zeitschr. Parasitenk.] 8: 332-350, ill. **Werneck, F. L.**—Trichodectes expansus (Mallophaga). [111] 31: 161-168, ill. **Williamson, E. B.**—Odonata from Yucatan. [Carnegie Inst. Wash.] Pub. 457: 139-143.

ORTHOPTERA.—Imms, A. D.—Phase variation in grasshoppers. [31] 137: 586. **Liebermann, J.**—Catalogo sistematico y razonado de Acridoideos Argentinos. Generos: Prionolopha, Diedronotus, Eleaochlora y Chromacris. [104] 7: 25-50, ill. (*).

HEMIPTERA.—Ball, E. D.—Some n. gen. of Leafhoppers related to Thamnotettix. [19] 31: 57-60. The food plants of the leafhoppers of the genus Exitianus. [19] 31: 71-72 (*). **de Carlo, J. A.**—Descripcion de especies nuevas de Belostomidos. [32] 10: 109-111, ill. Familia Belostomidae. Descripcion de una nueva especie y algunas sinonimias. [104] 7: 203-207, ill. **Dozier, H. L.**—A new genus and sps. of Fulgorid from Haiti. [40] No. 845: 2 pp., ill. **Hungerford, H. B.**—Aquatic and semiaquatic Hemiptera collected in Yucatan and Campeche. [Carnegie Inst. Pub.] Pub. 457: 145-150. (*). **Walley, G. S.**—New North American Corixidae with notes. [4] 68: 55-63, ill.

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SPECIAL NOTICES.—Revision der Australischen Acridiodeen. 2. Monographie von Y. Sjostedt. [K. Sven. Vet. Akad. Handl.] (3). xv. No. 2, 191 pp., ill. **Ward's Entomological Bulletin.** Vol. 3, nos. 6-7. Contains articles on: Type specimens: How to make acetate mounts; Pin labels, A killing light trap, A killing box, New prices on equipment and supplies and other notes.

A Monographic Revision of the Genus Ceuthophilus by T. H. Hubbell, University of Florida Publications, Biological Societies Ser., II, pp. 1-551, 39 plates.—This superb study of the second largest North American genus of the Orthoptera appeared on January 25th, 1936. It is, in my opinion, easily

one of the most complete and accurate of the larger monographs which have been published for the Order. Such is largely due to the deliberate and thorough manner in which the work has been done.

The great majority of the species of *Ceuthophilus* occur in the United States and southern Canada, only a very few being known from northern Mexico. Sixteen years have elapsed since the author began assembling and studying the 17430 specimens, among which he finds that 89 species and races are represented. During this time he was able to accomplish much difficult and intensive field work in the southern and eastern United States. All the members of the genus are soberly colored, flightless, make no sound and are nocturnal, hiding during the day and being consequently much more difficult to secure when general collecting is being done (except by trapping) than most forms of the Orthoptera. As a result the author frankly states that "Eventually the genus *Ceuthophilus* may be increased to half again or even twice its present size." The fact remains that he has so thoroughly characterized so large a number of species and races there should henceforward be no uncertainty as to the identity of material or at least as to its nearest known relatives. Hitherto identification of material from the literature has been always difficult, sometimes impossible.

Scudder in 1894 revised the genus, recognizing 57 species, many of which have been proved, or are now shown, to be synonymous. This was largely due to his reliance on unreliable characters, failure to recognize immatures as such, very poorly preserved material and the fact that, at that time, the very great importance of genitalic specialization was unrecognized. The resultant situation was so chaotic that, until now, it has been impossible to bring much order out of the existing confusion.

Hubbell's discovery of the distinctive specialization of the male pseudosternite is of primary importance. Though dissection is usually necessary, this organ shows diagnostic characters for the great majority of the species and is here for the first time thoroughly discussed and figured in all cases where this has been possible. Next in importance are the characters found in the male terminal tergites and subgenital plate and these have also been studied and illustrated in a most satisfactory manner. The descriptions of general structure and coloration are splendidly supplemented by discussions of individual variation. These analyses are particularly important in distinguishing females, the genitalia of which though also very fully discussed and figured, are vastly less valuable for diagnostic purposes than those of the opposite sex.

Maps showing the known distribution for each species appear on twelve plates. In a genus which includes so many species, they aid greatly in forming a general concept of the distributional factor, the importance of which has so often been undervalued. Keys for both sexes have been furnished, but in so large an aggregation of species, many of which are decidedly variable, no specimen should be determined from them without recourse to all other data.

The general discussion of the genus is masterly, the related North and Central American genera of the Rhaphidophorinae are carefully analyzed as well as the tribes of that subfamily and also the subfamilies of the Gryllacrididae.

The differentiation between "spines," "spurs" and "calcars" is clear. We would have preferred "moveable spines" for the second category and "spurs" for the third and we further agree with Caudell that three pairs of distal spurs (or calcars) should be recognized. In our opinion the use of "neotype," "plesiotype" and "plesiallotype" is not advisable, "specimen here described" being sufficient and self-explanatory.

Having for several years had the privilege of using the preliminary manuscript of this splendid work, we can state with certainty that it will prove to be of enormous value to all interested in the subject. MORGAN HEBARD.

AN ABRIDGED CATALOGUE OF CERTAIN SCUTELLEROIDEA (PLATASPIDAE, SCUTELLERIDAE, AND PENTATOMIDAE) OF CHINA, CHOSEN, INDO-CHINA, AND TAIWAN, by WILLIAM E. HOFFMANN. Lingnan University Science Bulletin, No. 7, 294 pp., Canton, China, issued August 21, 1935. Price $1.50 Mexican. —Designed as a supplement to Kirkaldy's "Catalogue of the Hemiptera" 1909, one finds the style reminiscent of that noted contribution. The form of citations for synonomy and distribution, with brief notes, is a distinct improvement over the older work and provides a model which later cataloguers would do well to follow. The present work catalogues 448 species and 32 varieties placed in 153 genera of the families Plataspidae, Scutelleridae and Pentatomidae. Of this number eleven genera and 86 species represent new forms described since the appearance of Kirkaldy's catalogue. Included is an annotated bibliography of 540 titles which should prove useful to students with limited library facilities. Appendix I deals with the faunal subregions of Eastern Asia, includes a sketch map, also discussion of distribution with species grouped in tabular form; likewise notes on the zoogeographical status of the Provinces of Greater

China and neighboring lands. Appendix II provides an alphabetical list of some 600 place-names in Eastern Asia from which collections have been recorded, with their classification into faunal subregions. An index to genera and species completes the work. The catalogue should be very useful to students of Asiatic Hemiptera and will doubtless stimulate further interest in this group of insects.—HARRY H. KNIGHT, Iowa State College, Ames.

OBITUARY

Professor ANTON HANDLIRSCH, world-renowned for his publications on fossil insects and for his encyclopedic knowledge of insects in general, died at Vienna, August 28, 1935. A recent number of *Konowia* (Band XIV, Heft 4) contains his portrait and an obituary notice by Dr. Max Beier, from which we take much of the following. Anton Handlirsch was born in Vienna January 20, 1865. At the wish of his father, Peter Handlirsch, he studied pharmacy and in 1883 obtained the diploma of Master of Pharmacy. His interest in this subject was very slight and, attaching himself to Friedrich Brauer, he became successively scientific helper, Assistant (1892), Adjunct Custodian (1899), Custodian of the second class (1906), Custodian of the first class (1918) and Director (1922) of the Natural History Museum of his native city. As he was pensioned in the last-named year, his activities as Director were short-lived.

His earliest scientific work was concerned with the Hymenoptera and reached its climax in a Monograph of the digging wasps related to *Nysson* and *Bembex* (1887-1894).

Taking charge of the Hemiptera at the Museum, he greatly increased them by the purchase of the Signoret collection. His most important work on this group was a monograph of the Phymatidae (1897).

Turning his attention to fossil insects, he published in 1906-08 his enormous *Die fossilen Insekten und die Phylogenie der rezenten Formen,* 1433 pages, 51 plates. This work enumerated or described all the fossil insects known to the date of

publication, grouped stratigraphically, summarized the paleontological results, gave a chronological summary of the most important classifications and genealogical trees of insects from 300 B.C. to 1905 A.D., and drew phylogenetic conclusions on which he based a new classification (presented in an early part of the book), followed by theoretical evolutionary considerations occupying nearly 40 pages. Salient features of his new classification were the division of insects into four classes: Collembola, Campodeoidea, Thysanura and Pterygogenea, the last-named embracing eleven subclasses (Orthopteroidea, Blattaeformia, Hymenopteroidea, Coleopteroidea, Embidaria, Perloidea, Libelluloidea, Ephemeroidea, Neuropteroidea, Panorpoidea and Hemipteroidea). He modified this classification in the two later comprehensive works mentioned below.

He contributed the third volume, 1201 pages, 1040 figures, on paleontology and classification of insects to Schroeder's *Handbuch der Entomologie* (1925), the introductions to arthropods and to insects and sections on many of the lower insectan orders to Kükenthal's *Handbuch der Zoologie* (1926-1935), having become unable to complete the account of the entire class. A list of Handlirsch's works, 100 titles from 1886 to 1935, is given by Dr. Beier.

Recognition of his accomplished work came from the Academy of Sciences of Vienna and the Universities of Vienna and of Graz. The entomological societies in Berlin, Zürich, Stockholm, Amsterdam, Madrid, Moscow and Philadelphia elected him honorary or corresponding member. P. P. CALVERT.

Nephrocyte Cells and their Function in the Aphididae. (Homoptera).

By FORREST W. MILLER, Amherst College, Amherst, Massachusetts.

The specific excretory organs to be found, generally, in insects are the Malpighian tubules. It has been known, since the internal anatomy of aphids was first studied in detail (Witlaczil, 1882), that aphids lack these structures of excretion. It has never been known definitely, what cells or groups of cells assume the function of excretion in this family of insects.

Most insects, as a rule, have in addition to the Malpighian tubules, free cells having the property of absorbing ammonia carmine which has been injected into the haemolymph. These cells retain, in the cytoplasm, a precipitate of carmine, being in effect storage or excretory cells (Kowalevsky, 1892).

A solution of ammonia carmine injected into the body of an aphid will show cells which have a similar property; absorbing ammonia carmine and retaining the carmine in the cytoplasm. These cells are spherical in shape, hyaline, with large nucleus, and are of a diameter of 0.01 mm. They show acid reaction to methyl red.

These cells are distributed generally throughout the body fluids but collect in large numbers in the cornicles. Sectioned material of the cornicles show these cells, in addition to trophocyte cells, in various stages of disintegration. At the same time diffusion to the outside takes place through the thin chitinous wall of the cornicle. This may be seen through a microscopic examination of a cornicle of a live aphid placed under a cover slip in a weak saline solution. After a time small globules of fluid may be seen collecting on the cornicle along the entire length.

It is believed that these cells are the active excretory cells of the aphididae because of:

(a) Property of absorbing and retaining carmine in the cytoplasm.

(b) High acidity of the cell.

(c) Accumulation and subsequent disintegration of these cells within the cornicles.

(d) Part diffusion of the cell cytoplasm through the cornicle wall.

LITERATURE CITED.

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Errata

The running head of the even-numbered pages 30-56 of the present volume of the NEWS should read "Feb., 1936" instead of "Jan., 1936."

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted— Names and addresses of those desiring Cocoons of Actias luna and Automeris io. Exchange considered. Eggs in season. Virginia Weaver, 822 S. College Ave., Tulsa, Okla.

Geometers Wanted from all parts of United States, for cash or exchange. Edward Guedet, P. O. Box 305, Napa, California.

Wanted—Tabanidae (Horseflies and Deerflies). Exchange, purchase, or for determination. G. B. Fairchild, P. O. Box 272, Monticello, Fla.

Exchange.—Lepidoptera of the Western United States for rare American or tropical specimens. C. W. Herr, Woodburn, Ore. R-3.

Wanted—Insects in exchange for Japanese insects or to buy. Tell me your wishes. Hiromu Yamamoto, Matsuo-Kozan. Iwategun Iwateken, Japan.

Would like to exchange Southern California insects for any North American Mutillidae (wingless wasps or velvety ants). Curtis Brown, 2950 G St., San Diego, California.

Wanted.—To get in touch with Specialists who will make determinations for a share of our duplicates. We have many undetermined specimens from all parts of Iowa.—H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Wanted.—Communication with anyone who has or is collecting Lepidoptera in Burlington County, New Jersey Also anyone having a microscope for sale.—E. P. Darlington, New Lisbon, N. J.

Wanted for Cash or Exchange.— North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted— Specimens of North American **Cephidae.** Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, Samia, Columbia or hybrid with S. Cecropia, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

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